Dear Water Sector colleagues and friends,

Greetings from the UNESCO Regional Office for Eastern and Southern Africa.

A very good morning to all connected to this Seminar on INTEGRATED URBAN WATER MANAGEMENT FOR HARARE, and thanks to my colleagues from UZ for inviting me to share some thoughts on the topic. Thank you also colleagues for being flexible and allowing me to join a bit later than originally planned.

Just connected – noticed u r already quite zoomed in to discuss the situation harare, the key water resource, lake chivero and its catchment, etc..
I would like to zoom a bit, and go to the big picture issues around water, and address the key question: Why is water managed so poorly?

Dear colleagues,
‘Water is life’ – we all know this slogan. Without it our life expectancy shrinks to merely a few days. This is captured well by British poet Auden who said: “Thousands have lived without love, not one without water”. So indeed, water is life. Yet, judging from the way we manage water, it seems that water continues to be one of the most under-valued resources on planet earth. And if that is so for surface water, imagine how this is for groundwater, which you can ‘t directly see.

When we discuss about Urban water in Harare, you can no longer avoid talking also about groundwater. And indeed, ‘out of sight – out of mind’, means the management of groundwater in many parts of the world is extremely worrisome.

The topic of the seminar today in fact relates to a key challenge faced by almost all cities and settlements globally: how to manage urban water sustainable. It responds to new global, national and local water realities, which indicate that humanity is facing numerous unprecedented and inter-connected water challenges, which need urgent attention to ensure our future food security, and provision of safe and sufficient water for healthy people and a healthy environment.

It is absolutely amazing for such crucial resource as water, on which our lives and that of future generation depend is so undervalued, and therefore mis-managed. In fact, I would go further and say, I don’t know any other main resource that is so poorly managed like water.

Let me therefore in the short time available try to address three key questions:
1. What does mismanagement of water mean?
2. Why is water not managed better?
3. What are the key drivers for change?

What is mismanagement of water?

Or in other words, what’s wrong with water in our cities today?

To understand this question we need to understand the history of water in cities. The existing (Western) approach to Urban Water Management scheme and corresponding infrastructure originates from the second half of the 19th century.

Stems from a major scientific discovery, notably by Louis Pasteur – the existence of sub-mircoscopic life, microorganisms. Shortly after, Robert Koch demonstrated the link between the presence of some types of bacteria in water and diseases like cholera, typhoid fever and other water-borne diseases.

This led to an approach of:
- Water treatment
- Piped water per household
- Drainage systems – flushing out used water back to the (often the same) water resource
- Later end of pipe treatment was added to reduce pollution

And now the problems started:
- The rapidly growing cities became more and more thirsty;
- Per capita water consumption went up as well;
- Since we had the luxury of piped water in every household, we started to use this high quality water for very inferior purposes: cleaning, washing, garden irrigation (do plants need crystal clear water?), and imagine, still today we use the same crystal clear 0-coliform water to flush the toilet. I call it an environmental and public health disaster.
- We used the same approach for our growing number of factories and industries; high water use, flush out with the pollution to water ways.
- Example breweries: Heineken – 3l/l, Zimbabwe: 15 l/l !!
- And then we have the most thirsty Sector of all – our food production system: agriculture and bioindustries. More than 70% of all water used globally goes to our food production. And why? Not because food itself contains so much water – no, its because our food production systems are so terribly inefficient in water use.
- So we irrigate land to ensure high crop yields, then we add fertilizer and pesticides to the same land, and much if not most of these nasty chemicals will therefore run off with the water into our rivers, lakes and groundwater systems.

And then we talk about water management for our cities? The result is:

- A water quality challenge: Massive pollution of all water resources, river, lakes, coastal, groundwater; look at lake Chivero – which was the prime water resource for Harare and ask your self what happened? How much would it cost to upgrade this polluted water to drinking water quality. Also many of the groundwater acquirers have suffered: pathogens, chemicals, N! (blue baby disease – NO3, NO2)
- A water quantity challenge: Many urban centres globally have reached or in fact exceeded the limits of sustainable water abstraction. This is not only so for surface water (if its finished you can see it); but many settlements have shifted towards groundwater, and are now facing land subsidence issues, and falling groundwater levels. This is certainly the case in Harare. Today an estimated 2 billion people in the world rely on groundwater for their basic needs. Not sustainable.
And then on top of this water quality crisis, and water quantity crisis we have climate change creates an ever more erratic hydrological cycle, numerous water related disasters, which further complicates the sustainable management of water resources, including of groundwater. – heavily impacting on these two dimensions of water. I don’t need to explain this in this region. Just refer to the situation of Cape Town, which was in the headline because the city almost dried up. If we don’t soon get our act together and manage water much better, we will see wars being fought over water.

And what has it done for people?

- Every year over 1 million people die from water;
- Cancer cases on the increase – relation to nasty chemicals (also in our water systems);
- Cost of running the municipal water cycle have grown exponentially (unaffordable for many);
- Economic losses are enormous (ecosystem destruction, wetlands disappear, health costs, etc)

Q2: so why is water so poorly managed?

- Ignorance
- Unawareness of the negative impacts of poor water management;
- Don’t care attitude, which is so common on many of the environmental challenges.
- Mindset: good water management is expensive, we want cheap water, we want cheap food, etc….
- Poor and uncoordinated institutional arrangements; Most countries have developed separate institutional arrangements to manage and delegate responsibilities for water resources and its different uses/services for agriculture, industries and households. Even within cities, there are often different departments for drinking water, drainage, sewage management and ecological functions of water.
- Transboundary water resources are not well managed and regulated;
- Lack of ownership: who owns water? we must recognise the transboundary nature of water, whether it’s the hydrological cycle, surface water or groundwater. This combined set of issues makes that the challenges at hand are phenomenally complex.
- Lack of vision and leadership: political level seems to understand there is a huge looming crisis, but no vision on what to do

Q3: So that brings me to the last question of today - the one billion $ question:

What are the key drivers for change?

We need four things to turn the tide:

- A better understanding and awareness of the water vulnerabilities and challenges; We need to generate a broad understanding about the fact that if managed properly, water can be an instrument of poverty alleviation, economic development and can potentially bring prosperity to all. In Agenda 2030 water is covered under SDG 6, but if managed properly, Water can become the catalytic driver of all SDGs. This is true also for the SADC region, which in recent years, has experienced both extreme droughts and floods and cyclones. The extent of the impacts is difficult to imagine, but I would go as far as saying that ‘water is the defining issue for sustainable development here in the SADC Region’, and this is probably so for many other regions as well.
- A vision that links long term sustainable water management to all other relevant sectors: energy, food, economy, health and environment;
- A compelling yet simple/concise strategy, agreed and operationalized at large scale.
- Commitment: political, financial, intellectual, general public (tax payers).

In closing let me say a few words about a **Strategy for water in the city of the future**:

This is the title of an international project I developed and led 2005-2011, which won the IWA Sustainability Award in 2012.

In an attempt to create a vision and a long term strategic approach for water, I designed the so called 3-SSA some 20 years ago. Three simple steps:

- Prevention and minimisation: Reduce water use (all uses)
- Reuse and resource recovery: Reuse water (water chain)
- Enhance natural self-purification: Help water (eco-)systems cope

1. **Prevention and minimisation**

As we all know “prevention is better than cure”. Can we make that work also for water?

Yes, we can:

If we reflect on the principles of cleaner production which has seen several decades of success in the industrial sector. So we identified the key principles: 4

a) Use the lowest amount of input resource per unit of product. – practise: We use between 100-350 l/c/d of drinking water when we only drink 1-3l/d, less than 1%

b) Do not use input material of higher quality than necessary. – practise: use drinking water for cleaning, washing, flush toilet.

c) Keep waste flows separate for better management. – practise: we mix in the household, grey water, toilet (urine, faecal matter), and then further in the sewer (industrial wastes, run off);

d) Consider other uses or reuse before considering anything waste. – practise: some 80% of domestic sewage is dumped directly into water flows, 20% receives some kind of treatment, a fraction of that treatment considers reuse and resource recovery.

And that leads us to the second step in the strategy: treatment for reuse and resource recovery.

Sewage = waste – but also a resource:

Make water more productive (= fit for reuse), but also:

- Recover energy (AWWT, biogas)
- Recover nutrients (N, P)

The third step aims to deal with residual contamination one cannot easily resolve in the first two steps.

Now assist water systems by enhancing/stimulating their self-purification capacity – ecohdrology.

Create rapids for aeration, use floodplains of rivers, introduce wetlands into river and lake systems, etc.

As a final comment:

We should also not shy way from the big questions. Think out of the box.

Since over 75% of water use globally is for food, we need to critically assess and question our food production systems.
Global food production today:

Occupies 25% of all habitable land
Is responsible for 70% of fresh water consumption (this is due to gross inefficiencies: we grow maize to feed chicken, of which we only consume the meat. Therefore it takes 5 m3 water/kg chicken meat; beef takes 15-18 m3/kg!); for 80% of deforestation, and for almost 30% of greenhouse gas emissions.
It is the largest driver of biodiversity loss
It is the largest non-point source pollution globally
Generates a range of ethical issues (bio-industry)

So the question arises, do we really need land to produce food, when this causes so many inefficiencies, and problems…
The answer is no, we don’t. We need ‘New Food’.

This could be done by:

- Large scale cultivation of algae biomass, and processing this into food products; or
- By shifting towards Cultured meat (growing meat cells under controlled conditions in large production centres/factories (this technology already exists and a number of start-ups are developing this further as we speak).

This is maybe some food for thought.
So let me stop here, and maybe come back some other time with a more structured presentation on ‘Water in the city of the future’.

I wish you all a most successful and productive Seminar.

Thank you.